

What is claimed:

1. A multi-point seat belt to increase survival chance for a passenger in the event of an accident of a transport system or turbulence-related vibrations of an aeroplane, comprising belt portions and two belt ends (EL) and (ER), one belt end (EL) of which with the extending belt portion, loosely guided by a D-ring and equipped with a belt retractor, having a clamping device, is arranged to a vehicle body, generally representing a post section of a motor vehicle, a body of the transport system or a floor thereof; a main buckle assembly having a master release button, adjacent to one side of a seat frame and arranged to the floor; at least two latch plates; a lower belt deflector which, adjacent to the other side of the seat frame and arranged to the floor, deflects and loosely guides the first and lap belt portion; and at least one upper buckle assembly arranged to a side (SR) of a seat backrest.

whereby a lower part of his body and an upper part are restrained by the lap belt portion and the second shoulder belt portion when the main latch plate is plug-in connected to the main buckle assembly; and the upper part is restrained by the first and second shoulder belt portion, both extending crosswise in an X-shape when the shoulder latch plate, fastened to the other belt end (ER) of the first shoulder belt portion, is plug-in connected to the upper buckle assembly.

2. A multi-point seat belt to increase survival chance for a passenger in the event of an accident of a transport system or turbulence-related vibrations of an aeroplane, comprising belt portions and two belt ends (EL) and (ER), one belt end (EL) of which with the extending belt portion, loosely guided by a D-ring and equipped with a belt retractor, having a clamping device, is arranged in one side (SL) of a seat backrest and the other belt end (ER) is arranged in the other side (SR) thereof; a main buckle assembly having a master release button and arranged to one side of a seat frame; a lower belt deflector which, arranged to the other side of the seat frame, deflects and loosely guides the first and lap belt portion and at least one latch plate;

whereby

a lower part of his body and an upper part are restrained by the lap belt portion and the second shoulder belt portion when the main latch plate is plug-in connected to the main buckle assembly; and the upper part is restrained by the first and second shoulder belt portion, both extending crosswise in an X-shape when the first shoulder belt portion is moved from a resting position at the side (SL) to an operating position at the other side (SR).

3. A multi-point seat belt to increase survival chance for a passenger in the event of an accident of a transport system or turbulence-related vibrations of an aeroplane, comprising belt portions and two belt ends (EL) and (ER), one belt end (EL) of which with the extending belt portion, loosely guided by an aperture of an upper portion of an upper belt deflector (5b), where the upper portion is located on a top edge of a seat backrest at one side (SL) thereof, and equipped with a belt retractor, having a clamping device, is arranged in the side (SL) and the other belt end (ER) arranged in the other side (SR);

a main buckle assembly having a master release button and arranged to one side of a seat frame;

a lower belt deflector which, adjacent to the other side of the seat frame and arranged to a floor, generally representing a floor of the transport system or a side rail of a motor vehicle, deflects and loosely guides the first and lap belt portion and at least one latch plate;

whereby

a lower part of his body and an upper part are restrained by the lap belt portion and the second shoulder belt portion when the main latch plate is plug-in connected to the main buckle assembly; and

the upper part is restrained by the first and second shoulder belt portion, both extending crosswise in an X-shape when the first shoulder belt portion is moved from a resting position at the side (SL) to an operating position at the side (SR).

4. A multi-point seat belt to increase survival chance for a passenger in the event of an accident of a transport system or turbulence-related vibrations of an aeroplane, comprising belt portions and two belt ends (EL) and (ER), one belt end (EL) of which with the extending belt portion, loosely guided by a D-ring and equipped with a belt retractor, having a clamping device, is arranged to a vehicle body, generally representing a post section of a motor vehicle, a body of the transport system or a floor thereof; and the other belt end (ER) is arranged in one side (SR) of a seat backrest;

a main buckle assembly having a master release button and arranged to one side of a seat frame;

a lower belt deflector which, arranged to the other side of the seat frame, deflects and loosely guides the first and lap belt portion and at least one latch plate;

whereby

a lower part of his body and an upper part are restrained by the lap belt portion and the second shoulder belt portion when the main latch plate is plug-in connected to the main buckle assembly; and

the upper part is restrained by the first and second shoulder belt portion, both extending crosswise in an X-shape when the first shoulder belt portion is moved from a resting position at the other side (SL) of the seat backrest to an operating position at the side (SR).

5. The multi-point seat belt to protect the passenger from submarining according to claim 1, further comprising an anti-submarining latch plate movable along the lap belt portion which is subdivided into two belt portions to restrain thighs of the passenger when the anti-submarining latch plate is plug-in connected to one of anti-submarining buckle assemblies which, arranged in a seat cushion, have a mutual release button on the seat.

6. The multi-point seat belt according to claim 1, further comprising a height- and width-adjusting mechanism consisting of

a pair of tubes of a seat backrest frame having a plurality of vertical locking slots, one pair of which is engaged with a locking handle, that can be pulled to detach therefrom and released to engage, when a height of a body proportion of the passenger is adjusted;

a frame consisting of a pair of outer frame-tubes, movable along the inner frame-tubes, a connecting member of all frame-tubes and a pair of outer tubes, in which inner tubes are movable, biased by springs and form- and force-locking connected to the locking handle, where the spring on a sleeve, secured by a pin, protruding through holes of the inner tube, presses against a spring rest of the outer tube;

a plurality of horizontal locking slots arranged along one of the outer tubes; and at least one buckle assembly, consisting of a buckle assembly, to connect to the latch plate, and a housing, form-locking connected to the buckle assembly, movable along the outer tubes and secured by a pawl biased by a spring, engaged with the horizontal locking slot (r) and detached therefrom by pulling the pawl to adjust to a width of his body proportion.

7. The multi-point seat belt according to claim 5, wherein the master release button is provided with release cables connecting to release buttons of the buckle assemblies where the master release button, when depressed, releases all the latch plates from the respective buckle assemblies.

8. The multi-point seat belt according to claim 7, wherein the lower belt deflector comprises a housing, having an attachment hole, and a pin, attached in the housing to form an aperture which loosely retains the shoulder latch plate when released.

9. The multi-point seat belt according to claim 8, wherein the pin is surrounded by a sleeve.

10. The multi-point seat belt according to claim 9, wherein the lower belt deflector is made of one piece.

11. The multi-point seat belt according to claim 8, wherein the passenger, intending to use the multi-point seat belt, easily accesses the released shoulder latch plate when being plug-in connected to an assisting buckle assembly which, having an easily-accessible release button, is arranged to the seat.

12. The multi-point seat belt according to claim 8, wherein the passenger, intending to use the multi-point seat belt, easily accesses the released shoulder latch plate when being plug-in connected to an assisting buckle assembly which, having an easily-accessible release button, is arranged to the post section.

13. The multi-point seat belt according to claim 1, further comprising a belt-feeding device consisting of

a belt housing equipped with the shoulder latch plate of the first shoulder belt portion; and an operating arm, to one end of which is connected the belt housing and the other end is connected to a guide tube pivotally attached in the seat backrest;

whereby the shoulder latch plate is inserted into and connected to the upper buckle assembly and the first shoulder belt portion is moved from a resting position to an operating position by rotatory movement of the operating arm.

14. The multi-point seat belt according to claim 5, further comprising a belt-feeding device consisting of

a belt housing equipped with the shoulder latch plate of the first shoulder belt portion;  
an operating arm, to one end of which is connected the belt housing and the other end is  
5 connected to a guide tube pivotally attached in a supporting tube of a head rest; and  
at least one drive apparatus to rotate the operating arm with the belt housing;  
whereby the shoulder latch plate is inserted into and connected to the upper buckle assembly  
and the first shoulder belt portion is moved from the resting position to the operating position  
by rotatory movement of the operating arm when the drive apparatus is activated.

15. The multi-point seat belt according to claim 14, wherein the drive apparatus returns the  
10 first shoulder belt portion from the operating position to the resting position, when a dwell  
time, predetermined for insertion of the shoulder latch plate into the upper buckle assembly, is  
exceeded.

16. The multi-point seat belt according to claim 14, wherein the operating arm and the belt  
15 housing have a vertical portion and a vertical tube, which, having two openings, facing each  
other, is movable along the vertical portion to adjust the height of the belt housing.

17. The multi-point seat belt according to claim 14, wherein the operating arm is a radial-  
adjustable tube where the first shoulder belt portion is moved from the resting position to the  
operating position by radial-adjusting movement of the radial-adjustable tube when the drive  
20 apparatus is activated.

18. The multi-point seat belt according to claim 14, wherein the master release button is  
provided with release wires connected to electrical release-motors of release buttons of the  
buckle assemblies and a release wire connected to the drive apparatus where the master  
release button, when depressed, releases all the latch plates from the respective buckle  
25 assemblies and returns the belt-feeding device to the resting position.

19. The multi-point seat belt according to claim 1, wherein the multi-point seat belt consists  
of a three-point seat belt and an additional shoulder belt,

to the end of which a transition buckle assembly is attached and the other end is provided  
with the shoulder latch plate, which is plug-in connected to the upper buckle assembly;  
30 where

a transition latch plate is arranged to the end of a lower shoulder belt portion of the three-  
point seat belt and

the passenger is restrained by plug-in connection of the main latch plate with the main buckle  
assembly and of the transition latch plate with the transition buckle assembly, where the  
35 lower shoulder belt portion projects through the lower belt deflector at a sufficient length  
( $l_1$ ) needed for the belt retractor to retract the first shoulder belt portion, defined by the  
lower shoulder belt portion and the additional shoulder belt, in a real-world accident.

20. The multi-point seat belt according to claim 2, wherein the multi-point seat belt consists of a three-point seat belt and an additional shoulder belt, to the end of which a transition buckle assembly is attached and the other end is arranged in the side (SR) of the seat backrest;

5 where

a transition latch plate is arranged to the end of a lower shoulder belt portion of the three-point seat belt and

the passenger is restrained by plug-in connection of the main latch plate with the main buckle assembly and of the transition latch plate with the transition buckle assembly, where the lower shoulder belt portion projects through the lower belt deflector at a sufficient length (l<sub>1</sub>) needed for the belt retractor to retract the first shoulder belt portion, defined by the lower shoulder belt portion and the additional shoulder belt, in a real-world accident.

21. The multi-point seat belt according to claim 20, wherein the other end of the additional shoulder belt is provided with a second belt retractor (13a), which, arranged in the side (SR) of the seat backrest (3.2), has a spring force, which is less than of the belt retractor.

22. The multi-point seat belt according to claim 2, further comprising a belt-feeding device consisting of

a pair of rollover tubes inserted into a pair of angle fittings of a seat backrest frame;

a belt housing, in which, movable along the pair of rollover tubes and guided thereby, the first shoulder belt portion is located; and

a drive apparatus, movable along a threaded spindle (20.1a), fastened to the pair of angle fittings, to translatory move the belt housing; whereby the first shoulder belt portion is moved from the resting position to the operating position by translatory movement of the belt housing when the drive apparatus is activated.

23. The multi-point seat belt according to claim 22, wherein the a belt-feeding device is provided with an operating arm,

to one end of which a belt ring is rigidly attached to receive and loosely guide the first shoulder belt portion and

the other end is connected to a guide tube, pivotally attached to a bearing casing of the seat backrest frame are rotated by a second drive apparatus; where the first shoulder belt portion is moved from the resting position to the operating position by translatory movement of the belt housing and rotatory movement of the operating arm when both drive apparatus are activated.

24. The multi-point seat belt according to claim 23, wherein the translatory movement of the belt housing and the rotatory movement of the operating arm are synchronised.

25. The multi-point seat belt according to protect the passenger in a rollover-accident to claim 24, wherein the belt-feeding device serves as a protective-rollover device having the pair of rollover tubes, along which the belt housing, having holes to receive a pair of legs of a safety bracket, is moved in the operating position,

the holes of the belt housing and holes of one of the rollover tubes are aligned with each other and

in excess of a threshold value in the rollover-accident the pair of legs of the safety bracket protrudes through all the holes, block the translatory movement of the belt housing and clamp the first shoulder belt portion.

26. The multi-point seat belt according to claim 24, wherein the belt end (ER) of the first shoulder belt portion is provided with a coupling fitting to receive energy absorbers.

27. The multi-point seat belt according to claim 24, wherein the belt retractor, attached to oblong holes of a stiff plate (13.3) of the seat backrest frame, is provided with a coupling fitting to receive energy absorbers, where in excess of threshold value the belt retractor are moveable along oblong holes and guided thereby.

5 28. The multi-point seat belt according to claim 3, wherein the upper belt deflector is height-adjustable and provided with a handle by movement of which a height thereof is adapted to a body proportion of the passenger.

29. The multi-point seat belt according to claim 3, wherein a lower portion of the non-height-adjustable upper belt deflector in the seat backrest is provided with a coupling fitting to  
10 receive energy absorbers.

30. The multi-point seat belt according to claim 4, wherein an upper belt deflector (5a), having an aperture to loosely guide the second shoulder belt portion, is attached to a height-adjustable head rest where an adaptation of a height thereof to a head of the passenger results in a self-adaptation of both shoulder belt portions, extending crosswise over the upper part of  
15 his body in the X-shape, to his body proportion.

31. The multi-point seat belt according to claim 4, further comprising a belt-feeding device (20), belt-feeding members of which in the resting or operating position are countersunk in the seat backrest, where the belt-feeding device consists of

20 an operating arm, to one end of which a belt ring, having a key, is rigidly attached to house and loosely guide the first shoulder belt portion and to the other end a guide tube is rigidly attached;

the guide tube, which, pivotally attached to a bearing casing of a seat backrest frame, is rotated from the resting position to the operating position by at least one drive apparatus, when activated; and

25 a belt-feeding plate, which, located on a top edge of the seat backrest at the side (SR) thereof, has a receptacle through which the key projects in the operating position;

whereby the drive apparatus, being activated, moves up over a head rest the belt-feeding plate and the guide tube with the operating arm and the first shoulder belt portion;

30 rotates the operating arm and the first shoulder belt portion over the head rest, a head of the passenger and in front of the upper part of his body until the key engages with the receptacle in a contact position and

35 countersinks the belt-feeding plate and the guide tube with the operating arm in the seat backrest until reaching the operating position in which the first shoulder belt portion extends across over the upper part of the body and the drive apparatus is switched off.

32. The multi-point seat belt according to claim 31, wherein the drive apparatus, activated in response to actuating a switch, is switched off when the operating position is reached.

33. The multi-point seat belt according to claim 31, wherein the drive apparatus, activated in response to activating a switch, attached in the main buckle assembly, upon contact with a  
40 cam of the main latch plate, when inserted therein, is switched off when the operating position is reached.

34. The multi-point seat belt according to claim 31, wherein the drive apparatus, activated in response to starting an engine, is switched off when the operating position is reached.

35. The multi-point seat belt according to claim 31, wherein the drive apparatus, activated in  
45 response to closing a vehicle door, is switched off when the operating position is reached.

36. The multi-point seat belt according to claim 31, wherein the drive apparatus is activated when the passenger takes his seat, where to a pressure sensor is built, where the drive apparatus is switched off when the operating position is reached.

5 37. The multi-point seat belt according to claim 31, wherein the drive apparatus is operable to return the first shoulder belt portion from the operating position to the resting position, when a dwell time, predetermined for engagement of the key with the receptacle, is exceeded.

38. The multi-point seat belt according to claim 31, wherein the drive apparatus, activated in response to depressing x-times the master release button, is switched off when the operating position is reached.

10 39. The multi-point seat belt to protect the passenger from submarining according to claim 31, wherein an anti-submarining latch plate is movable along the lap belt portion which is subdivided into two belt portions to restrain thighs of the passenger when the anti-submarining latch plate is plug-in connected to one of anti-submarining buckle assemblies each of which is provided with a release button and a length-adjustable belt and attached to a seat cushion.

15 40. The multi-point seat belt to protect the passenger from submarining according to claim 31, wherein an anti-submarining latch plate is movable along the lap belt portion which is subdivided into two belt portions to restrain thighs of the passenger when the anti-submarining latch plate is plug-in connected to one of anti-submarining buckle assemblies which, arranged in a seat cushion, have a mutual release button on the seat.

20 41. The multi-point seat belt according to claim 40, wherein the master release button is provided with release cables connecting to release buttons of the anti-submarining buckle assemblies and a release wire connected to the drive apparatus where the master release button, when depressed, releases the main latch plate and the anti-submarining latch plate from the respective buckle assemblies and returns the belt-feeding device to the resting position.

25 42. The multi-point seat belt according to claim 40, wherein a belt-catching member is attached to the seat backrest to intercept and hold the first shoulder belt portion when being in the resting position.

30 43. The multi-point seat belt according to claim 1, wherein the belt-detachable latch plate has a quick-release pin and a U-shaped portion to house the belt portion which is secured therein by the quick-release pin and detached therefrom by pulling it.